METHOD AND APPARATUS FOR ENCODING AND DECODING MOTION VECTOR BASED ON REDUCED MOTION VECTOR PREDICTOR CANDIDATES

CROSS-REFERENCE TO RELATED PATENT APPLICATIONS

[0001] This is a continuation application of U.S. patent application Ser. No. 14/677,735, filed on Apr. 2, 2015, which is a continuation application of U.S. patent application Ser. No. 13/009,105, filed on Jan. 19, 2011 in the U.S. Patent and Trademark Office, which claims the benefit of U.S. Provisional Patent Application No. 61/296,163, filed on Jan. 19, 2010 in the U.S. Patent and Trademark Office, and claims priority from Korean Patent Application No. 10-2011-0004015, filed on Jan. 14, 2011 in the Korean Intellectual Property Office, the disclosures of which are incorporated herein in their entireties by reference.

BACKGROUND

[0002] 1. Field

[0003] Apparatuses and methods consistent with exemplary embodiments relate to encoding and decoding a motion vector, and more particularly, to predictive encoding and decoding a motion vector of a current block.

[0004] 2. Description of the Related Art

[0005] In a codec such as MPEG-4 H.264/MPEG-4 advanced video coding (AVC), motion vectors of previously encoded blocks adjacent to a current block may be used to predict a motion vector of the current block. A median of the motion vectors of the previously encoded blocks adjacent to a left side, an upper side, and a right upper side of the current block is used as a motion vector predictor of the current block. A motion vector of a current block is not directly encoded and instead, a difference between a motion vector and a motion vector predictor is encoded.

SUMMARY

[0006] One or more exemplary embodiments provide a method and apparatus for predictive encoding and decoding a motion vector, and a computer readable recording medium having recorded thereon a computer program for executing the method.

[0007] According to an aspect of an exemplary embodiment, there is provided a method of encoding a motion vector, the method including: generating information about the motion vector based on a motion vector of a current block and a motion vector predictor of the current block by estimating the motion vector of the current block and determining a first motion vector predictor candidate from among a plurality of motion vector predictor candidates as the motion vector predictor of the current block based on a result of the estimating; generating a virtual motion vector by using a second motion vector predictor candidate from among the plurality of motion vector predictor candidates and the information about the motion vector, generating vector differences between the virtual motion vector and the plurality of motion vector predictor candidates, comparing the vector differences with the information about the motion vector, and selectively excluding the second motion vector predictor candidate from among the plurality of motion vector predictor candidates; and encoding the information about the motion vector and information about the motion vector predictor of the current block.

[0008] According to an aspect of another exemplary embodiment, there is provided a method of decoding a motion vector, the method including: decoding information about a motion vector of a current block; generating a virtual motion vector by using a predetermined motion vector predictor candidate from among a plurality of motion vector predictor candidates and the decoded information about the motion vector, generating vector differences between the virtual motion vector and the plurality of motion vector predictor candidates, comparing the generated vector differences with the decoded information about the motion vector, and selectively excluding the predetermined motion vector predictor candidate from among the plurality of motion vector predictor candidates; and determining a motion vector predictor of motion vector predictor candidates that are not excluded from among the plurality of motion vector predictor candidates as a motion vector predictor of the current block and restoring the motion vector of the current block based on the determined motion vector predictor and the decoded information about a motion vector.

[0009] According to an aspect of another exemplary embodiment, there is provided an apparatus for encoding a motion vector, the apparatus including: a motion vector estimator which generates information about the motion vector based on a motion vector of a current block and a motion vector predictor of the current block by estimating the motion vector of the current block and determines a first motion vector predictor candidate from among a plurality of motion vector predictor candidates as the motion vector predictor of the current block based on a result of the estimating; a candidate determiner which generates a virtual motion vector by using a second motion vector predictor candidate from among the plurality of motion vector predictor candidates and the information about the motion vector, generates vector differences between the virtual motion vector and the plurality of motion vector predictor candidates, compares the vector differences with the information about the motion vector, and selectively excludes the second motion vector predictor candidate from among the plurality of motion vector predictor candidates; and a motion vector encoder which encodes the information about the motion vector and information about the motion vector predictor of the current block.

[0010] According to an aspect of another exemplary embodiment, there is provided an apparatus for decoding a motion vector, the apparatus including: a motion vector decoder which decodes information about a motion vector of a current block; a candidate determiner which generates a virtual motion vector by using a predetermined motion vector predictor candidate from among a plurality of motion vector predictor candidates and the decoded information about the motion vector, generates vector differences between the virtual motion vector and the plurality of motion vector predictor candidates, compares the generated vector differences with the decoded information about the motion vector, and selectively excludes the predetermined motion vector predictor candidate from among the plurality of motion vector predictor candidates; and a motion vector restoring unit which determines a motion vector predictor candidate of motion vector predictor candidates that are not excluded from among the plurality of motion vector predictor candidates as a motion vector predictor of the current